

Portrush Primary School

Mathematics/Numeracy Policy

In Portrush Primary School the term 'Mathematics' is synonymous with the term 'Numeracy' throughout our school. Numeracy is the ability to apply appropriate mathematical skills and knowledge in familiar and unfamiliar contexts and in a range of settings throughout life, including the workplace. It involves the development of:

- an understanding of key mathematical concepts and their interconnectedness;
- appropriate reasoning and problem solving skills;
- the proficient and appropriate use of methods and procedures (formal and informal, mental and written); and
- active participation in the exploration of mathematical ideas and models.

Consideration has been given to externally produced guidance materials, specifically:

- Every School a Good School- a policy for school improvement (DE 2009);
- Better Numeracy in Primary Schools (ETI 2010); and
- Count Read: Succeed - A strategy to improve outcomes in Literacy and Numeracy 2010.

Aims

These are the aims which represent the benefits our pupils can expect to gain as a result of learning mathematics in Portrush Primary School. They form a set of basic principles upon which the teaching of mathematics in our school is based.

- To ensure that every pupil fulfils their full potential as a learner of mathematics/numeracy.
- To foster a positive attitude to mathematics/numeracy as an interesting and attractive part of the curriculum.
- To develop the ability to think clearly and logically, with confidence, flexibility and independence of thought.
- To develop a deeper understanding of mathematics/numeracy through a process of enquiry and investigation.

- To develop an understanding of the connectivity of patterns and relationships within mathematics.
- To develop the ability to apply knowledge, skills and ideas in real life contexts outside the classroom and become aware of the uses of mathematics/numeracy in the wider world.
- To develop the ability to use mathematics/numeracy as a means of communicating ideas.
- To develop an ability and inclination to work both alone and cooperatively to solve mathematical/numeracy problems.
- To develop personal qualities such as perseverance, independent thinking, cooperation and self-confidence through a sense of achievement and success.
- To develop an appreciation of the creative aspects of mathematics and an awareness of its aesthetic appeal and in so doing create a numeracy rich environment.

These basic principles are designed to contribute towards the achievement of the overall aim of the Northern Ireland Curriculum:

"To empower young people to develop their potential and to make informed and responsible decisions throughout their lives as individuals, as contributors to society and as contributors to the economy and the environment."

Learning and Teaching

The content of the mathematics curriculum taught at Portrush PS School is guided by our statutory requirement to deliver the statutory curriculum for mathematics as laid out in the Northern Ireland Curriculum. It sets out the minimum requirements that must be taught at each Key Stage, grouped into two areas: Requirements for Using Mathematics and Knowledge and Understanding of Mathematics. The staff have used this content to produce a School Scheme of Work for Mathematics. A set of principles has also been agreed which will inform and guide the nature of the learning experiences of our children, designed to achieve the aims detailed above. These principles are listed below, grouped under the two areas of mathematics:

1. Requirements for Using Mathematics

The NI Curriculum specifies a progression of process skills for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in Portrush Primary School will ensure that children:

- choose the appropriate materials, equipment and mathematics to use in a particular situation;
- use mathematical knowledge and concepts accurately;
- work systematically and check their work;
- use mathematics to solve problems and make decisions;
- develop methods and strategies, including mental mathematics;
- explore ideas, make and test predictions and think creatively;
- identify and collect information;
- read, interpret, organise and present information in mathematical formats;
- use mathematical understanding and language to ask and answer questions, talk about and discuss ideas and explain ways of working;
- develop financial capability;
- and use ICT to solve problems and /or present their work.

2. Knowledge and Understanding of Mathematics

Number

The NI Curriculum specifies a progression of number-based skills for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in Portrush Primary School will ensure that:

- children are encouraged to use mental calculations where appropriate;
- children have the opportunity to discuss and develop a range of calculation strategies;
- teaching encourages flexibility of thinking and utilisation of connections within mathematics;
- computational skills are developed and consolidated using a balance between practice and application in meaningful contexts;
- opportunities are provided for children to develop their estimation skills and will be encouraged to estimate answers before completing calculations;
- teaching places a strong emphasis on ensuring children gain a sound understanding of the Place Value basis of the Number System.

Measures

The NI Curriculum specifies a progression of skills in Measures for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in Portrush Primary School will ensure that:

- children use a range of measuring equipment in meaningful contexts and are encouraged to make choices regarding the most suitable equipment;
- children follow a progression beginning with direct comparison, through measuring with non-standard units, to measuring with standard units with increasing accuracy;
- children are given opportunities to develop estimation skills in all measures; and
- teaching places strong emphasis on ensuring that children understand that all measurement is approximate and that they can make sensible decisions on the accuracy necessary in different situations.

Shape and Space

The NI Curriculum specifies a progression of skills in Shape and Space for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in Portrush Primary School will ensure that:

- teaching places emphasis on observing and understanding the properties of 2D and 3D shapes;
- opportunities are provided for the practical construction and investigation of shapes; and
- children are given opportunities to explore position and movement in real-life contexts, utilising ICT where appropriate.

Handling Data

The NI Curriculum specifies a progression of skills in Handling Data for children to acquire as they develop their mathematical ability. In order to facilitate this, the teaching staff in Portrush Primary School will ensure that:

- teaching is designed to ensure that children understand that the collection, representation and interpretation of data is a means through which real-life decisions can be made;

- handling data skills are used as a means of solving problems, through a four-point process: Pose a question; Collect data; Organise, display & interpret data; Answer original question;
- children are given opportunities to make decisions regarding how the information is collected, how information is processed and how it is displayed;
- children are given opportunities to apply data handling skills in a range of contexts, across subject areas; and
- children are given opportunities to develop an increasing range of ICT based handling data skills.

Teaching Approaches

Although each teacher is an individual, with their own personal style of teaching; the staff have agreed that the following points will be a feature of all teaching in mathematics/numeracy in Portrush Primary School. These are designed to ensure that every pupil is given the opportunity to experience success and to achieve as high a standard as possible.

- Teachers will always strive to:
build children's confidence and self-esteem;
develop children's independence;
allow all children to experience regular success; and
make mathematics/numeracy a relevant and satisfying part of their school experience.
- Teachers will ensure that children make appropriate progress in their acquisition of skills, understanding, concepts, facts and competences as laid out in the NI Curriculum for Mathematics and Numeracy, through providing suitably differentiated learning activities to ensure that individual needs are properly addressed.
- Teachers will use a range of teaching strategies such as:
modelling by the teacher;
practice and consolidation;
practical work;
discussion, problem-solving; and
investigative work.

The choice of strategy will vary according to the age, ability, maturity and interests of the children.

- Teachers recognise the vital importance of discussion to gain understanding and to this end a sensible level of work-focused conversation will be a feature of most lessons.
- Teachers will ensure that the activities which the pupils experience in mathematics will enable them to develop the statutory Thinking Skills and Personal Capabilities set out in the NI Curriculum:
Thinking, Problem-Solving and Decision Making;
Managing Information;
Being Creative;
Self-Management; and
Working with Others.
- Teachers will ensure that the activities which the pupils experience in mathematics/ numeracy will also enable them to develop the statutory Cross Curricular Skills set out in the NI Curriculum:
Communication;
Using Mathematics; and
Using ICT.

Continuity and Progression

Continuity and Progression refer to the intentions of the school that each child has the opportunity to develop mathematical skills and understanding over time in the most effective manner possible. In order for continuity and progression to occur, staff have agreed:

- that the curriculum the children follow is defined by CCEA;
- the Scheme of Work has been planned collaboratively to ensure there are no gaps or unnecessary overlaps but progression as the children move through the school. The scheme identifies the content from each area of mathematics to be taught within each term;
- half-termly planning details agreed teaching approaches and methodologies in all areas of mathematics;
- all new ideas and concepts which the children encounter will be introduced from a starting point within the child's knowledge and understanding;
- assessment is designed to allow the teacher to accurately identify the child's present level of understanding so as to allow appropriate further work to be planned;

- activities in mathematics will be differentiated so that children are always working at a pace and level of challenge which matches their ability; and
- planning will be regularly monitored by the Numeracy Coordinator to evaluate the levels of continuity and progression achieved.

Monitoring and Evaluating Children's Work

Assessment is an integral and a continuous aspect of the teaching and learning process at Portrush Primary School. Much of the assessment occurs informally as part of each teacher's day to day work. Feedback is given to pupils, giving clear guidance as to how their learning can be improved. More formal methods of assessment are used to determine the levels of achievement of children at various times during the school year:

- **Class tests:** These are used throughout the school apart from the Foundation Stage (P1 and P2) where this particular type of assessment is inappropriate. Class tests are usually used at the end of a particular topic, to assess achievement of individual's skills/knowledge/understanding which has been taught within that topic.
- **Mental Maths:** Staff have agreed a set of learning outcomes for mental calculations for each year group. It is intended that as many children as possible should achieve these. The achievement of these are assessed on an ongoing basis.
- **Assessment for Learning:** Teachers ensure that all pupils are actively involved in their own learning through an Assessment for Learning approach:

Learning Intentions are shared and discussed with pupils to ensure that they clearly understand the actual learning which should take place.

Success Criteria are discussed and agreed, so that pupils are aware of the standards by which their work will be assessed and will be able to evaluate the quality of their own work against the agreed success criteria.

Feedback both oral and written, is given to pupils which details how they can improve their learning by reference to the agreed Success Criteria.

- **Progress Tracking:** teachers assign a summative level to pupils at the end of each year and record on a progress tracking grid to ensure that children have made progress. If satisfactory progress has not been made then children may be placed in a numeracy target group in the next school year.
- **Standardised Testing:** PTM is used from P4-P7 towards the end of the year. This test allows the school to measure each child's attainment in all areas of mathematics and compare this with an "average" for children of that age. The results are used to monitor individual's progress year on year, to rank order a class and to identify those children who have Special Needs in mathematics. Individual results are also aggregated, to allow the school to identify strengths and areas for improvement in the provision for mathematics across the whole school, across individual Key Stages and within particular groups and classes.
- **Statutory End of Key Stage Assessment:** this is a statutory requirement at the end of Key Stage 1 (P4) and at the end of Key Stage 2 (P7). Each child following ongoing assessment is assigned a Level of Attainment for each of the two areas of mathematics.

Assessment outcomes are used by the teacher to inform future planning.

Record Keeping

All relevant data is stored centrally by the Numeracy Coordinator and distributed to relevant teachers at the beginning of each academic year.

Target Setting

We use the results of Statutory Assessment as a vehicle for setting performance targets for mathematics. Each September the relevant teachers meet and share all available information related to individual children's learning to date and undertake a process to set targets for:

KS1

- % of children achieving Level 2 and above
- % of children achieving Level 3

KS2

- % of children achieving Level 4 and above
- % of children achieving Level 5

These targets are then compared with the actual %s achieved in KS1 and KS2 Assessment in May, benchmarked to schools of similar Free School Meals (FSM) and the N Ireland average.

Identifying and Addressing Underachievement

"The school uses the teachers' knowledge and experience, as well as a wide range of standardised tests, to identify early those children requiring additional help in mathematics, and provides appropriate and effective intervention to support them." (Better Numeracy in Primary Schools 2010)

In Portrush Primary School we consider it to be absolutely essential that each and every pupil fulfils their full potential as a learner of mathematics. To this end we aim to identify any pupils who are under-achieving and to ensure that an appropriate remediation process is set in place, based on specific identified areas for improvement. Every pupil's current PTM standardised score is compared with their most recent CAT standardised scores. If a pupil's PTM score is 10 or more points below their relevant CAT score, this may be an indication that the pupil is under-achieving in mathematics.

This is monitored from year to year and all data will also be contextualised to further understand children's progress or lack of progress e.g. SEN, EAL, gender, attendance etc.

Calculators

Our Mental Maths progression sets great value and importance on children knowing appropriate number facts off by heart and being able to use a variety of strategies to calculate in their heads.

We also believe that it is vital that children are able to perform pencil and paper calculations efficiently and effectively. We also recognise, however, that calculators are widely used in everyday life and we strive to ensure that the children are able to use a calculator efficiently and effectively. To this end, children in Portrush Primary School will, at a level matched to their mathematical progress:

- explore the use of calculators through play and number games;
- check the calculator result, by estimating before calculating and /or by performing an inverse operation;
- interpret a calculator display, e.g. in the context of money, or where decimal numbers are involved;
- use calculators in real-life problem solving activities, where the data used will not be so amenable to written or mental calculations. In these situations the emphasis is on selecting the appropriate calculation more than the actual working out of the calculation; and
- use calculators in investigative work e.g. trying lots of examples to find patterns, using trial and improvement methods to find an answer. Here the calculator supports rather than replaces mathematical thinking.

Mental Maths

At Portrush Primary School we recognise the vital importance of a child's ability to calculate mentally. We believe that an ability and inclination to calculate mentally leads to greater proficiency and understanding in all areas of mathematics and is a crucial skill in the application of mathematics in the world outside the classroom.

We strive to ensure that:

- children build up a bank of number facts which they know off by heart, to include addition, subtraction, multiplication and division facts;
- children are able to use these known facts to perform an increasing range of calculations in their heads, using a variety of methods; and
- children build up a good understanding of the Number System, based on Place Value of Base 10.

In order to facilitate this, teachers will:

- ensure children are taught a minimum of 10 minutes mental maths per day;
- implement a structured progression of mental maths, based on specific intended learning outcomes;
- regularly assess children's achievement of these learning outcomes;
- use a variety of teaching activities, including mathematical games and ICT, in whole class, group and individual work; and
- ensure that a record of the children's achievement in mental maths is kept and passed on to their next class teacher.

UICT (See also 'Portrush Primary School ICT Policy')

In Portrush Primary School we use a variety of ICT activities as part of the range of mathematical experiences which the children participate in. We believe that effective and appropriate use of ICT in mathematics can:

- facilitate a differentiated pace and level of learning that takes account of individual pupil abilities, including those who are more able;
- help provide appropriate support and scope for greater independence for children at of all abilities;
- facilitate access to sources of information from a wide variety of resources;
- foster the development of information skills that teach pupils to be discriminating in their use of information and to be able to shape and present it in ways appropriate to the context;
- increase motivation to learn; and
- provide a stimulating and non-threatening learning environment and engage children more deeply in their learning.

In Portrush Primary School ICT activities will include:

- whole class or group work, often led by the teacher. This may involve the use of an Interactive Whiteboard which is used as a direct teaching aid to demonstrate ideas and promote discussion and clear mathematical thinking;
- individual or small group activities. These usually involve the children working independently at a computer, usually to complement current work on a particular topic.

Resources include software available through the C2K Managed Service and also via the Internet.

ICT activities form part of the range of activities detailed in teachers' half termly planners for mathematics/numeracy.

Special Needs (See Portrush Primary School Special Needs Policy)

The SEN Policy applies to all areas of mathematics/numeracy and the individual learning needs of each child will be reflected within individual education plans. Differentiation and targeted teaching are directed towards all pupils to maximise their learning potential.

Leadership and Management of Numeracy

In Portrush Primary School, Mrs. J McNeill fulfils the role of Numeracy Co-ordinator and has responsibility for the management of numeracy development within the school.

Specifically these responsibilities include:

- in collaboration with the rest of the teaching staff, identifying priorities for development within mathematics/numeracy;
- contributing to the production of the School Development Plan, if it is to include mathematics/numeracy Development;
- producing Action Plans to address these issues;
- monitoring and evaluating the implementation of these Action Plans and the achievement of their success criteria;
- in conjunction with relevant teachers producing annual targets for standards achieved in Statutory Assessment;
- monitoring and evaluating pupil achievement and producing whole school performance data from these results;
- updating the School Mathematics/Numeracy Policy, to keep in line with curriculum changes;
- in conjunction with the whole staff, participating in a programme of self-evaluation of the quality and effectiveness of mathematics/numeracy provision;
- organising and leading school based INSET and School Development Days;
- liaising with outside services to ensure staff receive suitable and sufficient support and training;
- maintaining a file of evidence indicating standards achieved within the school;
- providing support to all members of staff; and
- discussing developments/issues with the SLT

Role of Parents

In Portrush Primary School we believe that parents have a vital role to play in ensuring their children make appropriate progress and realise their potential in mathematics. We actively seek strong partnerships with parents and will work to ensure that parents feel involved in their child's education.

In Portrush Primary School parents will:

- be able to discuss their child's progress in mathematics, or any areas of concern, at any time during the year by appointment with the class teacher;
- be invited to meet more formally with the class teacher twice per year at Parent Teacher Interviews;
- receive one written report on their child's strengths, weaknesses and progress per year, usually in June; and
- be encouraged to participate with their children in mathematical homework activities.

Homework (See also Portrush Primary School Homework Policy)

The nature of homework given will vary according to the age and level of progress of children but will always be designed to complement current class work, to:

- inform parents of the type of work their child is currently involved with;
- to allow the child to practice and improve skills introduced in class;
- to give the child the opportunity to improve their ability to work independently and organise themselves; and
- to give the teacher information on the extent to which children have achieved the skills/knowledge and understanding of what has been taught.

In order to achieve these objectives we would request parents, as far as is possible to:

- provide a suitable quiet area for homework activities;
- discuss with their child what they are expected to do before they start;
- ensure their child starts homework early enough so they can complete it by a reasonable time;
- present children with practical activities e.g. shopping which will reinforce concepts taught; and

- identify mathematics/numeracy in the children's every day environment e.g. road signs, counting step etc.

Evaluation of Mathematics Teaching

In Portrush Primary School we are committed to a process of continuous improvement, based around the four characteristics of a successful school as set out in "Every School a Good School- a Policy for School Improvement" (DE 2009)

- Child Centred Provision;
- High Quality Teaching and Learning;
- Effective Leadership; and
- School Connected to its Local Community

We believe that constant self-evaluation of our provision for mathematics/numeracy is the most effective way of ensuring we provide high quality teaching and learning experiences for our children, and that all our children realise their full potential in mathematics/numeracy.

Self evaluation takes place on two levels:

Class Level: Each class teacher monitors and evaluates their own teaching on an ongoing basis. This involves assessing children's achievement of intended learning outcomes. The information generated is used to determine the effectiveness of the teaching approaches used and to inform planning for further teaching and learning.

Management Level: The Numeracy Coordinator and Senior Leadership Team lead the monitoring and evaluating of the whole school's provision of mathematics/numeracy through:

- monitoring implementation of Mathematics/Numeracy Action Plans;
- evaluating the achievement of success criteria contained within action plans;
- coordinating self-evaluation through monitoring of the half termly planning;
- monitoring the results of Statutory Assessment at KS1 and KS2 using benchmarked performance data;
- detailed analysis of pupil performance data from standardised assessment and statutory assessment outcomes; and
- leading an on-going, collegial approach to whole school self-evaluation.

In Portrush Primary School self-evaluation is an ongoing process which is a component of our Cycle of Development. The information gained through self-evaluation feeds back into the cycle to enable us to plan for future improvement and determine training and development needs.

Cross Curricular Skills

Using Mathematics across the Curriculum

Using Mathematics is the skill of applying mathematical concepts, processes and understanding appropriately in a variety of contexts. Ideally these should be relevant to real life situations that require a mathematical dimension. Children are likely to acquire and consolidate their mathematical knowledge, concepts and skills within the Area of Learning for mathematics/ numeracy. However they should be given opportunities to transfer their understanding, as appropriate, to other areas of the curriculum. Children can demonstrate their mathematical knowledge, understanding and skills in a variety of ways to communicate, manage information, think critically, solve problems and make decisions. Some of these may include:

Language and Literacy

- sequencing events in daily routines
- accessing information from tables
- reading material involving times, dates, shapes, positional prepositions (behind, underneath etc.), comparative language (taller, heavier etc.)
- talking and listening skills resulting from mathematical discussions

The World Around Us

- comparative language
- estimating and measuring skills
- handling data (e.g. displaying the results of an experiment in graphical form)
- carrying out surveys
- sorting materials according to properties
- accessing information from tables, charts and graphs
- positional language
- directions
- points of compass
- coordinates

- scale in maps and plans
- timelines and sequences
- accessing information from computer databases
- carrying out surveys and interpreting and displaying results

Physical Education

- directions and movement
- positional language
- shape and symmetry
- timing events
- measuring events (e.g. furthest long jump)

The Arts

- shape and symmetry
- repeating patterns
- language to describe 2D and 3D shapes
- tessellating designs
- proportion

Review Procedures

This Mathematics/Numeracy Policy is designed to reflect current practice within the school environment. Although the overall aims for mathematics/numeracy teaching and learning are likely to remain fairly constant, the practices evolve over time as the school progresses in its development of mathematics/ numeracy provision. Accordingly this Policy is under a process of constant review and will be updated regularly to ensure it continues to reflect current practice and to achieve its designated purposes.

Reviewed December 2015